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Technical analysis of the second biennial update report of Singapore submitted on 16 December 2016

Summary report by the team of technical experts

Summary

According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention (non-Annex I Parties), consistent with their capabilities and the level of support provided for reporting, were to submit their first biennial update report (BUR) by December 2014. Further, paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report. As mandated, the least developed country Parties and small island developing States may submit BURs at their discretion. This summary report presents the results of the technical analysis of the second BUR of Singapore conducted by a team of technical experts in accordance with the modalities and procedures contained in the annex to decision 20/CP.19.

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I. Introduction and process overview

A. Introduction

1. The process of international consultation and analysis (ICA) consists of two steps: the technical analysis of the submitted biennial update report (BUR), resulting in a summary report for each BUR analysed, followed by a workshop for the facilitative sharing of views under the Subsidiary Body for Implementation.

2. According to decision 2/CP.17, paragraph 41(a), Parties not included in Annex I to the Convention (non-Annex I Parties), consistent with their capabilities and the level of support provided for reporting, were to submit their first BUR by December 2014. Paragraph 41(f) of that decision states that non-Annex I Parties shall submit a BUR every two years, either as a summary of parts of their national communication in the year in which the national communication is submitted or as a stand-alone update report.

3. Further, according to paragraph 58(a) of the same decision, the first round of ICA is to be conducted for non-Annex I Parties commencing within six months of the submission of the Parties' first BURs. The frequency of developing country Parties' participation in subsequent rounds of ICA, depending on their respective capabilities and national circumstances, and the special flexibility for small island developing States and the least developed country Parties, will be determined by the frequency of the submission of BURs.

4. Singapore submitted its first BUR on 8 December 2014, which was analysed by a team of technical experts (TTE) in the first round of technical analysis of BURs from non-Annex I Parties, conducted from 18 to 22 May 2015 in Bonn, Germany. After the publication of its summary report, Singapore participated in the first workshop for the facilitative sharing of views, convened in Bonn on 20 May 2016.

5. This summary report presents the results of the technical analysis of the second BUR of Singapore undertaken by a TTE in accordance with the provisions on the composition, modalities and procedures of the TTE under ICA contained in the annex to decision 20/CP.19.

B. Process overview

6. Singapore submitted its second BUR on 16 December 2016. The BUR does not include an explanation as to why it was submitted more than two years after the date of submission of the first BUR. In the course of the technical analysis of the BUR, Singapore explained that it interpreted the two-year timeline in terms of the month of submission and not the specific date of submission.

7. The technical analysis of the BUR took place from 22 to 26 May 2017 in Bonn and was undertaken by the following TTE, drawn from the UNFCCC roster of experts on the basis of the criteria defined in decision 20/CP.19, annex, paragraphs 2–6: Ms. Ruleta Camacho Thomas (former member of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention from Antigua and Barbuda), Ms. Anna Sikharulidze (Georgia), Mr. Ioannis Sempos (Greece), Mr. Ching Tiong Tan (Malaysia), Ms. Helen Plume (New Zealand) and Mr. Jongikhaya Witi (South Africa). Ms. Plume and Mr. Witi were the co-leads. The technical analysis was coordinated by Ms. Alma Jean and Mr. Marlan Pillay (secretariat).

8. During the technical analysis, in addition to the written exchange, through the secretariat, to provide technical clarifications on the information reported in the BUR, the TTE and Singapore engaged in consultation[1] on the identification of capacity-building needs for the preparation of BURs and participation in the ICA process. Following the technical analysis of Singapore's second BUR, the TTE prepared and shared a draft

[1] This consultation was conducted through teleconferencing.

summary report with Singapore on 11 August 2017 for its review and comment. Singapore, in turn, provided its feedback on the draft summary report on 25 September 2017.

9. The TTE responded to and incorporated the Party's comments referred to in paragraph 8 above and finalized the summary report in consultation with Singapore on 20 December 2017.

II. Technical analysis of the biennial update report

A. Scope of the technical analysis

10. The scope of the technical analysis is outlined in decision 20/CP.19, annex, paragraph 15, according to which the technical analysis aims to, without engaging in a discussion on the appropriateness of the actions, increase the transparency of mitigation actions and their effects, and shall entail the following:

(a) The identification of the extent to which the elements of information listed in paragraph 3(a) of the ICA modalities and guidelines (decision 2/CP.17, annex IV) have been included in the BUR of the Party concerned (see chapter II.B below);

(b) A technical analysis of the information reported in the BUR, specified in the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" (hereinafter referred to as the UNFCCC reporting guidelines on BURs) (decision 2/CP.17, annex III), and any additional technical information provided by the Party concerned (see chapter II.C below);

(c) The identification, in consultation with the Party concerned, of capacity-building needs related to the facilitation of reporting in accordance with the UNFCCC reporting guidelines on BURs and to participation in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention (see chapter II.D below).

11. The remainder of this chapter presents the results of each of the three parts of the technical analysis of Singapore's BUR outlined in paragraph 10 above.

B. Extent of information reported

12. The elements of information referred to in paragraph 10(a) above include: the national greenhouse gas (GHG) inventory report; information on mitigation actions, including a description of such actions, an analysis of their impacts and the associated methodologies and assumptions, and the progress made in their implementation; information on domestic measurement, reporting and verification (MRV); and information on support needed and received.

13. According to decision 20/CP.19, annex, paragraph 15(a), in undertaking the technical analysis of the submitted BUR, the TTE is to identify the extent to which the elements of information listed in paragraph 12 above have been included in the BUR of the Party concerned. The TTE considers that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs. Specific details on the reporting on each of the required elements are provided in annex I.

14. The TTE notes improvements in the reporting in the second BUR compared to the first. Information on GHG inventories, mitigation actions and their effects, and needs and support reported in the second BUR demonstrates that the Party has taken into consideration the areas for enhanced transparency noted by the TTE in the summary report on the technical analysis of its first BUR. These include: improved reporting of activity data (AD) for the semiconductor industry; the estimation and reporting of emissions from the agriculture and land use, land-use change and forestry (LULUCF) sectors; improved reporting of methodologies for encouraging investment with a mitigation focus in cogeneration plants and energy efficiency programmes for households; and improved

reporting of institutional arrangements for GHG inventories; mitigation actions; and finance, technology and capacity-building.

C. Technical analysis of the information reported

15. The technical analysis referred to in paragraph 10(b) above aims to increase the transparency of mitigation actions and their effects, without engaging in a discussion on the appropriateness of those actions. Accordingly, the technical analysis focused on the transparency of the information reported in the BUR.

16. For information reported on national GHG inventories, the technical analysis also focused on the consistency of the methods used for preparing those inventories with the appropriate methods developed by the Intergovernmental Panel on Climate Change (IPCC) and referred to in the UNFCCC reporting guidelines on BURs.

17. The results of the technical analysis are presented in the remainder of this chapter.

1. Information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis

18. As per the scope defined in paragraph 2 of the UNFCCC reporting guidelines on BURs, the BUR should provide an update to the information contained in the most recently submitted national communications, including, among other things, information on national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis. In their national communications, non-Annex I Parties report on their national circumstances following the reporting guidance contained in decision 17/CP.8, annex, paragraphs 3–5.

19. In accordance with decision 17/CP.8, annex, paragraph 3, Singapore reported in its second BUR the following information on national circumstances: a description of national development priorities, objectives and circumstances, including information on features of geography, climate and economy that may affect the ability to deal with mitigating and adapting to climate change, as well as information regarding national circumstances and constraints on their specific needs and concerns arising from the adverse effects of climate change and/or the impact of the implementation of response measures, as referred to in Article 4, paragraph 8, and, as appropriate, in Article 4, paragraphs 9 and 10, of the Convention.

20. Singapore reported that it currently accounts for about 0.12 per cent of global emissions and that it has taken and will continue to take steps to reduce carbon emissions. However, its small size, dense urban landscape and geographical constraints limit the potential for the development of renewable energy and continue to pose a challenge regarding its emission reduction potential. Specifically, Singapore reports on limitations in terms of its use of alternative energy sources: biomass; carbon capture, storage and utilization; geothermal; hydroelectric; marine (tidal and wave power); nuclear; solar and wind. Singapore also presented a summary of its efforts to manage these challenges and has indicated that it is developing an integrated response to urban challenges through investments in research and development for the areas of energy, water and land, and liveability.

21. Singapore described in its BUR the existing institutional arrangements relevant to the preparation of its national communications and BURs on a continuous basis. The description covers key aspects of the institutional arrangements, such as: the legal status and roles and responsibilities of the overall coordinating entity; the involvement and roles of other institutions; mechanisms for information and data exchange; and the quality assurance/quality control procedures for the GHG inventory. In particular, Singapore reported on the role of the Inter-Ministerial Committee on Climate Change (IMCCC) to ensure coordination on Singapore's approach to climate change, recognizing that climate change is an issue with many dimensions that cut across the responsibilities of several government ministries in Singapore. The IMCCC Executive Committee oversees the work of the International Negotiations Working Group, the Long-Term Emissions and Mitigation

Working Group and the Resilience Working Group. To ensure effective coordination on Singapore's domestic and international policies, plans and actions on climate change, the National Climate Change Secretariat (NCCS) was established as a dedicated unit in July 2010 under the Prime Minister's Office. NCCS is part of the Strategy Group which supports the Prime Minister and the Cabinet to establish priorities and strengthen strategic alignment across government.

22. In paragraph 25 of the summary report on the technical analysis of Singapore's first BUR, the TTE noted areas where the transparency of the reporting on institutional arrangements could be further enhanced. The TTE noted that Singapore included relevant information in its second BUR and the TTE commends the Party for enhancing the transparency of its reporting.

2. National greenhouse gas emissions by sources and removals by sinks

23. As indicated in table 1 in annex I, Singapore reported information on its GHG inventory in its BUR, mostly in accordance with paragraphs 3–10 of the UNFCCC reporting guidelines on BURs and paragraphs 8–24 of the "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention", contained in the annex to decision 17/CP.8.

24. Singapore submitted its second BUR in 2016 and the GHG inventory reported is for the year 2012, which is consistent with the reporting time frame.

25. GHG emissions and removals for the 2012 inventory were estimated using mainly a tier 1 methodology from the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the Revised 1996 IPCC Guidelines), applying in some cases also the IPCC *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* (hereinafter referred to as the IPCC good practice guidance). Emissions from the LULUCF sector were estimated using the IPCC *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (hereinafter referred to as the IPCC good practice guidance for LULUCF), with emission factors from the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) and the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* if the factors were not included or deviated from those in the IPCC good practice guidance for LULUCF. For the waste and industrial processes and product use (IPPU) sectors, values from the 2006 IPCC Guidelines were used for individual categories, such as for the estimation of hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) from integrated circuit and semiconductor production.

26. The LULUCF sector represented a net carbon sink in Singapore in each year of the time series 1990 to 2012. The annual net removals in 2012 amounted to 239.21 gigagrams of carbon dioxide equivalent (Gg CO_2 eq).

27. The total GHG emissions for 2012 reported in the BUR, including LULUCF, amounted to 48,094.65 Gg CO_2 eq, dominated by emissions of CO_2 (46,538.16 Gg CO_2 eq), followed by PFCs (930.83 Gg CO_2 eq), nitrous oxide (N_2O) (411.68 Gg CO_2 eq), SF_6 (89.33 Gg CO_2 eq), methane (CH_4) (86.73 Gg CO_2 eq) and HFCs (37.92 Gg CO_2 eq). Singapore's GHG emissions have steadily increased from 2000 to 2012, as illustrated in the time-series graph of GHG emissions on page 43 of the BUR. From 2000 to 2012, Singapore's economy grew at a compound annual growth rate (CAGR) of 5.7 per cent, while real gross domestic product levels (in 2010 Singapore dollars (SGD)) increased by 94 per cent from SGD 183 billion in 2000 to SGD 355 billion in 2012. In the same period, Singapore's GHG emissions grew at a slower rate, with a CAGR of 2.0 per cent, or an increase of 26 per cent (9,839 Gg CO_2 eq) from 2000 to 2012.

28. Singapore reported a table of GHG emissions in 2012, which contained information that was comparable with tables 1 and 2 of the "Guidelines for the preparation of national communications for Parties not included in Annex I to the Convention", contained in the annex to decision 17/CP.8. Singapore reflected notation keys as a footnote to the table where numerical data were not provided, and indicated that blank cells in the table mean "not occurring" instead of reporting the notation key "NO". However, the table did not

include the agriculture sector and memo items, including international bunkers and CO_2 emissions from biomass. The TTE noted that using notation keys in the table will be consistent with the 2006 IPCC Guidelines and would further enhance the transparency of the GHG inventory reporting.

29. Singapore reported comparable information in a table[2] in order to address the tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF and the sectoral reporting tables annexed to the Revised 1996 IPCC Guidelines. During the technical analysis, Singapore stated that the notation key "NO" should also be reported for the category other land because that category does not exist in the country, and also explained that the emissions from conversions of land to sea should be reported under a separate category, other. Singapore indicated that these matters will be addressed in the next BUR submission.

30. Most GHG emissions come from the energy sector, dominated by CO_2 (46,777.39 Gg CO_2 eq), followed by N_2O (307.04 Gg CO_2 eq) and CH_4 (41.20 Gg CO_2 eq). Almost all of these emissions are from fuel combustion. Emission estimates were based on the sectoral approach using the tier 1 methodology and the default conversion and emission factors provided in the Revised 1996 IPCC Guidelines. The tier 2 methodology, in conjunction with vehicle statistics, was used for estimating emissions of CH_4 and N_2O from the combustion of petrol and diesel in land transport.

31. Emissions of HFCs, PFCs and SF_6 in the IPPU sector came from the manufacture of semiconductors and amounted to 37.92 Gg CO_2 eq, 930.83 Gg CO_2 eq and 89.33 Gg CO_2 eq, respectively. For the semiconductor industry, Singapore used the notation key "C" (confidential) for the AD in the worksheet. The TTE commends Singapore for this improvement since the first BUR. During the technical analysis, Singapore indicated that it is in the process of understanding the end uses of refrigeration and air conditioning that lead to other sources of HFC emissions. The TTE noted that including emission estimates for those industries would further enhance the transparency of the inventory.

32. For the agriculture sector, Singapore did not report GHG emissions, because they are considered negligible in comparison with other economic sectors. The small agricultural sector focuses mainly on produce such as eggs, fish and vegetables for local consumption to supplement the country's imports of these items. The TTE noted that including emission estimates for this sector or providing a relevant notation key and explanation would enhance the transparency of the BUR.

33. For the LULUCF sector, Singapore reported GHG emissions and removals for 2012. Net removals reported for 2012 amounted to 239.21 Gg CO_2 eq. Singapore indicated that it estimated annual LULUCF emissions and removals for all pools for the time series 1990–2012. The LULUCF sector represented a net carbon sink in Singapore in each year of the time series 1990–2012. The TTE commends Singapore for reporting inventory estimates for the LULUCF sector.

34. For the waste sector, Singapore reported CH_4 emissions of 45.53 Gg CO_2 eq and N_2O emissions of 104.62 Gg CO_2 eq from wastewater handling as the only sources of emissions. Emissions from waste incineration were reported in the energy sector, and estimated using the tier 1 methodology and the default conversion factor and emission factors provided in the 2006 IPCC Guidelines.

35. A time series of GHG emissions from 2000 to 2012 is provided at an aggregate level (total national emissions) in the second BUR. During the technical analysis, Singapore explained that the time series was prepared in a consistent manner following the methodology outlined in the BUR. The TTE noted that including the explanation that the information indicates a consistent time series back to the years reported in the previous national communication and BUR would enhance the transparency of the BUR.

36. Singapore described in its BUR the institutional framework for the preparation of its 2012 GHG inventory. The preparation of the national GHG inventory is a multi-agency

[2] The table is on page 39 and the annex (pp.84–85) of the BUR.

effort led by the National Environment Agency (NEA), following a four-stage GHG inventory preparation process involving: data collection by the data owner; quality control (QC) of the computation of emissions by NEA; quality assurance (QA) by an independent team within NEA; and endorsement by the MRV Taskforce.

37. Singapore reported a key category analysis performed for the level of emissions. The analysis identified 12 key categories, of which 11 categories were CO_2 emissions from the energy sector. Information was provided in its second BUR on QA/QC measures for the collection/compilation of data and computation of emissions of all sectors.

38. Singapore reported information on CO_2 emissions from fuel combustion using only the sectoral approach. During the technical analysis, Singapore explained that, as a global trading hub, it experiences volatility in trade data as a direct result of its large and volatile trade volumes, coupled with the presence of a large refining and petrochemical sector. While emissions calculated using the sectoral approach were considered to be more accurate than those calculated using the reference approach, internal assessment is being undertaken on the data and the results of the reference approach in order to examine any large differences between the two approaches. The TTE noted that transparency of the information reported would be enhanced if the estimated emissions of CO_2 fuel combustion from the reference approach were also reported, and if necessary, any large differences between the sectoral and reference approach.

39. Information on international aviation and marine bunker fuels was not reported in the BUR but was provided as a separate memo to the secretariat, which was made available to the TTE during the technical analysis week. During the technical analysis, Singapore further clarified that the emissions from these international bunker fuels, which are excluded from its national GHG emissions inventory total as reported in its BUR, could be estimated based on the IPCC methodology. The TTE noted that reporting information on international bunker fuels in the BUR, or indicating reasons for excluding this information, could further enhance the transparency of the BUR.

40. Singapore reported information on its use of global warming potential (GWP) values, applying 100-year GWP values consistent with those provided by the IPCC in its Second Assessment Report.

41. Singapore reported information on the uncertainty assessment (level) of its national GHG inventory. The uncertainty analysis is based on the three levels of confidence as described in the Revised 1996 IPCC Guidelines and covers all source categories reported in the BUR. The results obtained, as reported in the BUR, revealed that 99.2 per cent of GHG data have a confidence level of either 'medium' or 'high'. A large proportion of these data are emissions from fuel combustion. The categories that were assessed to be of lower confidence accounted for about 0.8 per cent of total emissions/removals.

42. In paragraphs 30–31 of the summary report on the technical analysis of Singapore's first BUR, the TTE noted where transparency of reporting on confidentiality of AD for the semiconductor industry and for the estimation of emissions from the LULUCF sector could be enhanced. The TTE noted that Singapore took into consideration this area of improvement mentioned in paragraphs 31 to 34 above, and commends the Party for enhancing the transparency of the information reported.

3. Mitigation actions and their effects, including associated methodologies and assumptions

43. As indicated in table 2 in annex I, Singapore reported in its BUR, completely in accordance with paragraphs 11–13 of the UNFCCC reporting guidelines on BURs, information on mitigation actions and their effects, to the extent possible.

44. The information reported provides a clear and comprehensive overview of the Party's mitigation actions and their effects, including its national context. In its BUR, Singapore frames its national mitigation planning and actions in the context of the national emission reduction target by 2020 and 2030. Singapore reported that it is committed to reduce emissions by 16 per cent below the 'business as usual' (BAU) level by 2020. The Party reported that, having ratified the Paris Agreement in September 2016, Singapore has

taken a 2030 pledge as well, which builds on the 2020 commitment and aims to reduce the intensity of emissions by 36 per cent from the 2005 level by 2030 and to stabilize emissions with the aim of peaking around 2030. Singapore reports the importance of the energy sector and energy-sector policy in achieving these targets and thus most of the mitigation actions are in the energy sector. Singapore reports that the national policy for the energy sector includes pricing of fuel and electricity according to supply and demand, which incentivized enterprises and households to use energy wisely, switching to a cleaner fuel mix in electricity generation and improving energy efficiency. Although there are physical limits to the deployment of alternative or renewable energy sources, Singapore continues to actively invest in research, development and demonstration of clean energy technologies.

45. Singapore reported a summary of its mitigation actions in tabular format. Consistent with decision 2/CP.17, annex III, paragraph 12(a), Singapore reported the names of mitigation actions or groups of actions, coverage (sector and gases) and quantitative goals and progress indicators in tables 1-6 of the BUR. For some reported mitigation actions, the reference for quantitative goals is clearly indicated as the BAU scenario (e.g. for "Fuel mix switch away from fuel oil", "Manufacturing Energy Efficiency", GreenMark new buildings, increasing the public transport modal share), but for others (e.g. "Promoting Off-Peak Cars and non-motorised transport, e.g. walking and cycling", "Car/Taxi fuel efficiency – CEVS", "Fuel switching in industry" and others) such a reference is not provided. During the technical analysis, Singapore clarified that the quantitative goals for all mitigation measures are calculated against BAU projections. The TTE noted that the transparency of the information reported could be enhanced if the references for goals are clearly indicated for all mitigation actions in the BUR.

46. Thirteen mitigation actions were reported for the energy sector. These mitigation measures are grouped in the following broad areas of: shifting to cleaner energy sources; improving energy efficiency and promoting use of cleaner fuels in industry; greening buildings; shifting travel demand to low-emission modes and reducing vehicular emissions; and improving energy performance standards of household appliances and promoting energy efficiency to households. Consistent with decision 2/CP.17, annex III, paragraph 12(b) and (c), the information on the methodologies and assumptions, as well as the objectives of the mitigation actions and the steps taken to implement them were reported for all mitigation actions. Consistent with decision 2/CP.17, annex III, paragraph 12(d), progress in the implementation of mitigation actions was also reported, in terms of achievements and estimated GHG emission reductions in 2014. The reported estimated GHG emission reductions in 2014 for mitigation actions range from 0.28 kt CO_2 to 4.0 Mt CO_2. The highest emission reductions of 4.0 Mt CO_2 in the energy sector are achieved through switching away from fuel oil to natural gas for power generation. The Party reports that, currently, natural gas constitutes about 95 per cent of the fuel mix for electricity generation.

47. Two mitigation actions were reported for the waste sector, including "Increase overall recycling rate" and "Wastewater sludge disposal by incineration". Consistent with decision 2/CP.17, annex III, paragraph 12(b) and (c), the information on the methodologies and assumptions, as well as the objectives of the mitigation actions and the steps taken to implement them were reported for these actions. Consistent with decision 2/CP.17, annex III, paragraph 12(d), progress in the implementation of mitigation actions was also reported, in terms of achievements and estimated GHG emission reductions in 2014. The mitigation action "Increase overall recycling rate" was initiated in 2014 and thus did not result in any GHG emission reductions in that year, whereas estimated GHG emission reductions of the action "Wastewater sludge disposal by incineration" amounted to 0.08 Mt of CH_4 in 2014.

48. Singapore provided information on its involvement in international market mechanisms as a Party to the Kyoto Protocol. It reported that, as at September 2016, it had six registered clean development mechanism (CDM) projects, which are estimated to reduce emissions by approximately 473 kt CO_2 eq annually. The Party reported that more information on the six registered CDM projects was already provided in Singapore's third national communication and its first BUR.

49. Singapore has reported information on its domestic MRV arrangements, consistent with decision 2/CP.17, annex III, paragraph 13. Singapore outlined in the BUR that domestic MRV for Singapore's mitigation actions is a whole-of-government effort, where each government agency is responsible for monitoring, measuring and documenting the progress of mitigation actions under its purview. The information collected by lead agencies is then consolidated by the Long-Term Emissions and Mitigation Working Group (LWG) secretariat annually, which assesses the effects of measures and tracks the progress towards meeting the mitigation target.

50. In paragraph 36 of the summary report on the technical analysis of Singapore's first BUR, the TTE noted where transparency of reporting on methodologies for some of the mitigation actions, specifically for encouraging investments in cogeneration plants and energy efficiency programmes for households, could be further enhanced. The TTE noted that Singapore took into consideration this area of improvement in tables 2 and 5 of its second BUR, and commends the Party for enhancing the transparency of the information reported.

51. In paragraph 41 of the summary report on the technical analysis of Singapore's first BUR, the TTE noted that the transparency of reporting on domestic MRV could be further enhanced by providing information on how the data for MRV of mitigation actions are collected. The TTE noted that Singapore took into consideration this area of improvement on page 52 under the section on "Domestic Measurement, Reporting and Verification" of its second BUR, and commends the Party for enhancing the transparency of the information reported.

52. Overall, the TTE finds that the information provided on mitigation actions in Singapore's second BUR is well organized, transparent and consistent with UNFCCC reporting guidelines on BURs. The TTE commends the Party for this effort.

4. Cross-cutting domestic measurement, reporting and verification

53. As indicated in table 2 in annex I, Singapore reported in its BUR, in accordance with paragraph 13 of the UNFCCC reporting guidelines on BURs, a description of its domestic MRV arrangements.

54. Singapore's domestic MRV system is designed at the national level in the following main areas: the BUR and national communication preparation process; and the GHG inventory system. The MRV Taskforce under LWG is tasked with coordinating inter-agency MRV efforts. LWG reports to IMCCC. The preparation of the national GHG inventory is a multi-agency effort led by NEA. The MRV system forms part of the existing institutional arrangements for Singapore, rendering it cost-effective.

5. Constraints and gaps, and related technology, financial, technical and capacity-building needs, including a description of support needed and received

55. As indicated in table 3 in annex I, Singapore reported in its BUR, partially in accordance with paragraphs 14–16 of the UNFCCC reporting guidelines on BURs, information on finance, technology and capacity-building needs and support received.

56. Singapore, in the national circumstances section of its BUR, identified its small size, dense urban landscape and lack of access to alternative energy as constraints that limit the extent of GHG emissions mitigation that can be undertaken. Singapore outlined its efforts to address its capacity-building priorities in its second BUR, including Singapore's efforts to pursuing technological innovation through collaboration with tertiary institutes in research and development to build human capacity in this area.

57. In paragraphs 38, 39 and 40 of the summary report on the technical analysis of the Singapore's first BUR, the TTE noted areas where the transparency of the reporting on constraints and gaps, and related technical and capacity-building needs could be further enhanced. The TTE noted that Singapore included relevant information in its second BUR and the TTE commends the Party for enhancing the transparency of its reporting.

58. In its second BUR, Singapore mentioned that it will continue to develop its technology road maps for key areas to guide research, development and demonstration

efforts. The TTE noted, however, that specific information on technology needs was not provided. During the technical analysis, Singapore provided information on the existence of seven technology road maps, namely, on solar photovoltaic technology, carbon capture and storage/utilization, building energy efficiency, green data centre, industry energy efficiency, solid waste management and electro-mobility. Each road map highlights the areas that could help in Singapore's mitigation actions up to 2030 and beyond. Singapore also indicated that the technology road maps identify and prioritize the technologies and actions required to accelerate these technologies' entry into the marketplace. Singapore also provided information on the collaborative nature of the processes used to develop these road maps and explained that collaborative initiatives will be used to guide its technology master plans and funding initiatives to address climate change challenges. The TTE noted that the provision of specific information on this element in future BURs would enhance the transparency of the reported information.

59. Regarding capacity-building and technical support, the Party reported in the BUR that it has benefited from participation at many international technical workshops dealing with the various facets of combating climate change. Singapore also provided information on technical support and capacity-building in the context of its own actions to improve its capacity. For example, it reported about its ongoing efforts (self-funded) to build capacity to more effectively monitor and report on GHG emissions and removals from the LULUCF sector. The TTE also noted that specific information on related financial resources and technology transfer received was not included in the report, in accordance with decision 2/CP.17, annex III, paragraph 14. During the technical analysis, Singapore clarified that the information on financial resources and technology transfer received was not provided because it did not receive any support in these areas. The TTE noted that although support was not received, this should be clarified in the BUR to enhance transparency of the information reported.

60. Singapore's second BUR included information on various international technical cooperation programmes for fellow developing countries that it co-organized in collaboration with other governments, the UNFCCC secretariat, the United Nations Environment Programme and other agencies. The TTE commends Singapore for its participation in these cooperation programmes.

D. Identification of capacity-building needs

61. In consultation with Singapore, the TTE did not identify any capacity-building needs related to the facilitation of the preparation of subsequent BURs and participation in ICA.

62. The TTE noted that, although capacity-building needs were not identified during the technical analysis, Singapore reported on the following ongoing efforts to enhance its capacity:

(a) Institutional strengthening and capacity-building to improve future work on the national GHG inventory in general, which will include training for new and existing officers involved in the preparation of the national GHG inventory;

(b) Increasing its capacity to effectively monitor and report on GHG emissions and removals from the LULUCF sector thorough a self-funded project;

(c) In the area of technical innovation, collaboration with international tertiary institutes in the area of research and development to build human capacity and building an ecosystem of local and international research institutes to strengthen Singapore's capabilities to catalyse breakthroughs and facilitate partnerships with industry;

(d) Participation in technical workshops to share expertise and experiences and learn about the various facets of combating climate change including, in particular, strengthening capacity and familiarity with the use of the 2006 IPCC Guidelines and software through lectures and hands-on practice sessions.

63. No capacity-building needs for technical analysis of Singapore's second BUR were identified by the TTE, in consultation with Singapore, in the summary report on the technical analysis of its first BUR.

III. Conclusions

64. The TTE conducted a technical analysis of the information reported in the second BUR of Singapore in accordance with the UNFCCC reporting guidelines on BURs. The TTE concludes that the reported information is mostly consistent with the UNFCCC reporting guidelines on BURs and provides an overview of: national circumstances and institutional arrangements relevant to the preparation of national communications on a continuous basis; the national inventory of anthropogenic emissions by sources and removal by sinks of all GHGs not controlled by the Montreal Protocol, including a national inventory report; mitigation actions and their effects, including associated methodologies and assumptions; constraints and gaps, and related technical and capacity-building needs; domestic MRV; and other information relevant to the achievement of the objective of the Convention. During the technical analysis, additional information was provided by Singapore clarifying aspects of its GHG inventory (including on the use of notation keys and on fluorinated gases), clarifying quantitative goals for mitigation measures, and on its technology road maps. The TTE concluded that the information analysed, including that reported in the second BUR and the additional information provided during the technical analysis, is mostly transparent.

65. Singapore reported information on the institutional arrangements relevant to the preparation of BURs. It has established sufficient institutional arrangements that allow for the sustainable preparation of BURs. The TTE commends Singapore for the progress made and noted that the plans to enhance its capacities related to the MRV processes, as outlined in its BUR, would further enhance its reporting in BURs.

66. In its second BUR, Singapore reported information on its national GHG inventory for the year 2012. This included GHG emissions and removals of CO_2, CH_4 and N_2O for all relevant sources and sinks, as well as the fluorinated gases. The inventory was developed on the basis of the Revised 1996 IPCC Guidelines, though in some cases the IPCC good practice guidance, the IPCC good practice guidance for LULUCF and the 2006 IPCC Guidelines were applied for individual key categories. The total GHG emissions for 2012 were reported as 48,094.65 Gg CO_2 eq (including LULUCF). Twelve key categories were identified, with CO_2 and the energy sector identified as the main gas and key category, respectively.

67. Singapore reported information on mitigation actions and their effects, including the mitigation goal of reducing emissions to 16 per cent below BAU levels by 2020 and a 36 per cent reduction in emission intensity from 2005 levels by 2030. These mitigation actions were categorized in the context of sectors and groups of actions. The annual GHG emission reductions for mitigation actions reported for the energy sector were in the range of 0.28 kt CO_2 to 4.0 Mt CO_2 for the year 2014 when compared with the BAU scenario, with the highest emission reductions of 4.0 Mt CO_2 achieved through a switch away from fuel oil to natural gas for power generation. The annual GHG emission reductions for reported mitigation actions in the waste sector amounted to 0.08 Mt of CH_4 for the year 2014 when compared with the BAU scenario.

68. Singapore reported information on key constraints and gaps. The Party also outlined its approach to addressing its technological and capacity-building needs. Regarding capacity-building and technical support, Singapore reported in the BUR that it has benefited from participation at many international technical workshops dealing with the various facets of combating climate change. Information on related financial resources and technology transfer received was not reported in the BUR. During the technical analysis, Singapore clarified that Singapore did not receive any support in these areas. The TTE also noted that although the report mentions that Singapore is implementing a technology road map, specific information on technology needs was not provided. During the technical

analysis, Singapore provided information on the existence of seven technology road maps which specify the technology needs.

69. The TTE, in consultation with Singapore, did not identify capacity-building needs that aim to facilitate reporting in accordance with the UNFCCC reporting guidelines on BURs and to participate in ICA in accordance with the ICA modalities and guidelines, taking into account Article 4, paragraph 3, of the Convention. The TTE noted that, although capacity-building needs were not identified during the technical analysis, Singapore reported on the ongoing efforts to enhance its capacity.

Annex I

Extent of the information reported by Singapore in its second biennial update report

Table 1
Identification of the extent to which the elements of information on greenhouse gases are included in the second biennial update report of Singapore

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/No/NA*	*Comments on the extent of the information provided*
Decision 2/CP.17, paragraph 41(g)	The first BUR shall cover, at a minimum, the inventory for the calendar year no more than four years prior to the date of the submission, or more recent years if information is available, and subsequent BURs shall cover a calendar year that does not precede the submission date by more than four years	Yes	Singapore submitted its second BUR in December 2016; the GHG inventory reported is for year 2012
Decision 2/CP.17, annex III, paragraph 4	Non-Annex I Parties should use the methodologies established by the latest UNFCCC guidelines for the preparation of national communications from non-Annex I Parties approved by the COP or those determined by any future decision of the COP on this matter	Yes	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
Decision 2/CP.17, annex III, paragraph 5	The updates of the sections on the national inventories of anthropogenic emissions by sources and removals by sinks of all GHGs not controlled by the Montreal Protocol should contain updated data on activity levels based on the best information available using the Revised 1996 IPCC Guidelines, the IPCC good practice guidance and the IPCC good practice guidance for LULUCF; any change to the emission factor may be made in the subsequent full national communication	Yes	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
Decision 2/CP.17, annex III, paragraph 6	Non-Annex I Parties are encouraged to include, as appropriate and to the extent that capacities permit, in the inventory section of the BUR		

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/ No/ NA*	*Comments on the extent of the information provided*
	(a) Tables included in annex 3A.2 to the IPCC good practice guidance for LULUCF	Yes	Comparable information was reported using the 2006 IPCC Guidelines; however, information on the subcategories other land and other was not consistent in the BUR (summary table p. 39 and annex p. 85)
	(b) The sectoral report tables annexed to the Revised 1996 IPCC Guidelines	Partly	Comparable information was reported, but the agriculture sector and memo items on international bunkers and CO_2 emissions from biomass were not included
Decision 2/CP.17, annex III, paragraph 7	Each non-Annex I Party is encouraged to provide a consistent time series back to the years reported in the previous national communications	Partly	A time series is reported for 2000–2012. However, the years 2000–2011 are reported in the BUR only at an aggregate level (total national emissions), and the BUR contains insufficient information for the consistency of the time series to be ascertained
Decision 2/CP.17, annex III, paragraph 8	Non-Annex I Parties that have previously reported on their national GHG inventories contained in their national communications are encouraged to submit summary information tables of inventories for previous submission years (e.g. for 1994 and 2000)	Yes	This information is reported for the years 1994, 2000 and 2010
Decision 2/CP.17, annex III, paragraph 9	The inventory section of the BUR should consist of a national inventory report as a summary or as an update of the information contained in decision 17/CP.8, annex, chapter III (National greenhouse gas inventories), including:		
	(a) Table 1 (National greenhouse gas inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol and greenhouse gas precursors)	Partly	Comparable information was reported but excluding the agriculture sector and memo items on international bunkers and CO_2 emissions from biomass
	(b) Table 2 (National greenhouse gas inventory of anthropogenic emissions of HFCs, PFCs and SF_6)	Partly	Comparable information was reported; however, the HFC emissions reported excluded the sources from refrigeration and air conditioning

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/ No/ NA*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 10	Additional or supporting information, including sector-specific information, may be supplied in a technical annex	Yes	Singapore submitted 2012 worksheets and summary tables for 1994, 2000 and 2010 as an annex to its BUR
Decision 17/CP.8, annex, paragraph 13	Non-Annex I Parties are encouraged to describe procedures and arrangements undertaken to collect and archive data for the preparation of national GHG inventories, as well as efforts to make this a continuous process, including information on the role of the institutions involved	Yes	Information on the inventory preparation process, which includes QA/QC, was reported
Decision 17/CP.8, annex, paragraph 14	Each non-Annex I Party shall, as appropriate and to the extent possible, provide in its national inventory, on a gas-by-gas basis and in units of mass, estimates of anthropogenic emissions of:		
	(a) CO_2	Yes	
	(b) CH_4	Yes	
	(c) N_2O	Yes	
Decision 17/CP.8, annex, paragraph 15	Non-Annex I Parties are encouraged, as appropriate, to provide information on anthropogenic emissions by sources of:		
	(a) HFCs	Partly	HFC emissions from refrigeration and air conditioning were not included
	(b) PFCs	Yes	
	(c) SF_6	Yes	
Decision 17/CP.8, annex, paragraph 16	Non-Annex I Parties are encouraged, as appropriate, to report on anthropogenic emission by sources of other GHGs, such as:		
	(a) CO	No	
	(b) NO_x	No	
	(c) NMVOCs	No	
Decision 17/CP.8, annex, paragraph 17	Other gases not controlled by the Montreal Protocol, such as SO_x, included in the Revised 1996 IPCC Guidelines may be included at the discretion of the	No	

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/No/NA*	*Comments on the extent of the information provided*
	Parties		
Decision 17/CP.8, annex, paragraph 18	Non-Annex I Parties are encouraged, to the extent possible, and if disaggregated data are available, to estimate and report CO_2 fuel combustion emissions using both the sectoral and the reference approach, and to explain any large differences between the two approaches	No	The information was reported only for the sectoral approach
Decision 17/CP.8, annex, paragraph 19	Non-Annex I Parties should, to the extent possible, and if disaggregated data are available, report emissions from international aviation and marine bunker fuels separately in their inventories		
	(a) International aviation	No	
	(b) Marine bunker fuels	No	
Decision 17/CP.8, annex, paragraph 20	Non-Annex I Parties wishing to report on aggregated GHG emissions and removals expressed in CO_2 eq should use the GWP value provided by the IPCC in its Second Assessment Report based on the effects of GHGs over a 100-year time-horizon	Yes	
Decision 17/CP.8, annex, paragraph 21	Non-Annex I Parties are encouraged to provide information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol, including a brief explanation of the sources of emission factors and activity data. If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe the source and/or sink categories, methodologies, emission factors and activity data used in their estimation of emissions, as appropriate.		

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/ No/ NA*	*Comments on the extent of the information provided*
	Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building:		
	(a) Information on methodologies used in the estimation of anthropogenic emissions by sources and removals by sinks of GHGs not controlled by the Montreal Protocol	Yes	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
	(b) Explanation of the sources of emission factors	Yes	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
	(c) Explanation of the sources of activity data	Yes	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
	(d) If non-Annex I Parties estimate anthropogenic emissions and removals from country-specific sources and/or sinks that are not part of the Revised 1996 IPCC Guidelines, they should explicitly describe:	No	Singapore used a combination of the Revised 1996 IPCC Guidelines and the 2006 IPCC Guidelines
	(i) Source and/or sink categories		
	(ii) Methodologies		
	(iii) Emission factors		
	(iv) Activity data		
	(e) Parties are encouraged to identify areas where data may be further improved in future communications through capacity-building	Yes	
Decision 17/CP.8, annex, paragraph 22	Each non-Annex I Party is encouraged to use tables 1 and 2 of the guidelines annexed to decision 17/CP.8 in reporting its national GHG inventory, taking into account the provisions established in paragraphs 14–17. In preparing those tables, Parties should strive to present information which is as complete as possible. Where numerical data are not provided, Parties should use the notation	Partly	Emissions for 2012 are reported in a table (BUR, p. 34), which does not contain the memo items on international bunkers and CO_2 emissions from biomass

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/No/NA*	*Comments on the extent of the information provided*
	keys as indicated		
Decision 17/CP.8, annex, paragraph 24	Non-Annex I Parties are encouraged to provide information on the level of uncertainty associated with inventory data and their underlying assumptions, and to describe the methodologies used, if any, for estimating these uncertainties:		
	(a) Level of uncertainty associated with inventory data	Yes	
	(b) Underlying assumptions	Yes	
	(c) Methodologies used, if any, for estimating these uncertainties	Yes	

Note: The parts of the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" on reporting information on GHG emissions by sources and removals by sinks in BURs are contained in decision 2/CP.17, paragraph 41(g), and paragraphs 3–10. Further, as per paragraph 3 of those guidelines, non-Annex I Parties are to submit updates of their national GHG inventories in accordance with paragraphs 8–24 of the "Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention", contained in the annex to decision 17/CP.8. The scope of such updates should be consistent with the non-Annex I Party's capacity and time constraints and the availability of its data, as well as the level of support provided by developed country Parties for biennial update reporting.

Abbreviations: BUR = biennial update report, COP = Conference of the Parties, GHG = greenhouse gas, GWP = global warming potential, IPCC = Intergovernmental Panel on Climate Change, IPCC good practice guidance = *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*, IPCC good practice guidance for LULUCF = *Good Practice Guidance for Land Use, Land-Use Change and Forestry*, NA = not applicable, non-Annex I Parties = Parties not included in Annex I to the Convention, NMVOC = non-methane volatile organic compound, QA/QC = quality assurance/quality control, Revised 1996 IPCC Guidelines = *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories*, 2006 IPCC Guidelines = *2006 IPCC Guidelines for National Greenhouse Gas Inventories*.

Table 2
Identification of the extent to which the elements of information on mitigation actions are included in the second biennial update report of Singapore

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/No*	*Comments on the extent of the information provided*
Decision 2/CP.17, annex III, paragraph 11	Non-Annex I Parties should provide information, in a tabular format, on actions to mitigate climate change, by addressing anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol	Yes	
Decision 2/CP.17, annex III, paragraph 12	For each mitigation action or group of mitigation actions, including, as appropriate, those listed in document FCCC/AWGLCA/2011/INF.1, developing		

Decision	*Provision of the reporting guidelines*	*Yes/ Partly/No*	*Comments on the extent of the information provided*
	country Parties shall provide the following information to the extent possible:		
	(a) Name and description of the mitigation action, including information on the nature of the action, coverage (i.e. sectors and gases), quantitative goals and progress indicators	Yes	
	(b) Information on:		
	(i) Methodologies	Yes	
	(ii) Assumptions	Yes	
	(c) Information on:		
	(i) Objectives of the action	Yes	
	(ii) Steps taken or envisaged to achieve that action	Yes	
	(d) Information on the:		
	(i) Progress of implementation of the mitigation actions	Yes	
	(ii) Progress of implementation of the underlying steps taken or envisaged	Yes	
	(iii) Results achieved, such as estimated outcomes (metrics depending on type of action) and estimated emission reductions, to the extent possible	Yes	
	(e) Information on international market mechanisms	Yes	
Decision 2/CP.17, annex III, paragraph 13	Parties should provide information on the description of domestic measurement, reporting and verification arrangements	Yes	

Note: The parts of the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" on the reporting of information on mitigation actions in biennial update reports are contained in decision 2/CP.17, annex III, paragraphs 11–13.

Table 3

Identification of the extent to which the elements of information on finance, technology and capacity-building needs and support received are included in the second biennial update report of Singapore

Decision	*Provision of the reporting requirements*	*Yes/ Partly/No*	*Comments on the extent of the informati provided*
Decision 2/CP.17, annex III, paragraph 14	Non-Annex I Parties should provide updated information on:		
	(a) Constraints and gaps	Yes	Information on constraints and gaps was reported
	(b) Related financial, technical and	Yes	Information on current efforts

Decision	*Provision of the reporting requirements*	*Yes/ Partly/ No*	*Comments on the extent of the information provided*
	capacity-building needs		to strengthen its capacity in the area of technical innovation was provided in chapter 2 of the BUR
Decision 2/CP.17, annex III, paragraph 15	Non-Annex I Parties should provide:		
	(a) Information on financial resources received	No	Singapore clarified that the information on financial resources and technology transfer received was not provided because it did not receive any support in these areas
	(b) Information on technology transfer	No	
	(c) Information on capacity-building received	Yes	Information on a number of workshops was provided
	(d) Information on technical support received from the Global Environment Facility, Parties included in Annex II to the Convention and other developed country Parties, the Green Climate Fund and multilateral institutions for activities relating to climate change, including for the preparation of the current biennial update report	No	Singapore clarified that the information on technical support related to climate change, including for the preparation of its second BUR was not provided because it did not receive any support in these areas
Decision 2/CP.17, annex III, paragraph 16	With regard to the development and transfer of technology, non-Annex I Parties should provide information on:		
	(a) Technology needs, which are nationally determined	Partly	The report mentions that Singapore will continue to develop technology road maps for key areas to guide research, development and demonstration efforts and to realize the long-term mitigation potential of key sectors
	(b) Technology support received	Yes	Information is provided with respect to ongoing collaboration with tertiary institutions in the area of technology innovation

Note: The parts of the "UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention" on the reporting of information on finance, technology and capacity-building needs and support received in BURs are contained in decision 2/CP.17, annex III, paragraphs 14–16.

Abbreviation: BUR = biennial update report.

Annex II

Documents and information used during the technical analysis

A. Reference documents

"Composition, modalities and procedures of the team of technical experts for undertaking the technical analysis of biennial update reports from Parties not included in Annex I to the Convention". Annex to decision 20/CP.19. Available at http://unfccc.int/resource/docs/2013/cop19/eng/10a02.pdf#page=12.

"Modalities and guidelines for international consultation and analysis". Annex IV to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

"UNFCCC biennial update reporting guidelines for Parties not included in Annex I to the Convention". Annex III to decision 2/CP.17. Available at http://unfccc.int/resource/docs/2011/cop17/eng/09a01.pdf.

"Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention". Annex to decision 17/CP.8. Available at http://unfccc.int/resource/docs/cop8/07a02.pdf#page=2.

First biennial update report of Singapore. Available at: http://unfccc.int/8722.php.

First; second and third national communication of Singapore. Available at http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php.

B. Additional information provided by the Party

The following document[1] was provided by the Party in response to requests for technical clarification during the technical analysis:

Information note to UNFCCC (international bunker fuels).

[1] Reproduced as received from the Party.